(51) International Patent Classification 5 : G07F 13/02, 7/10, G09G 5/14 G09G 1/16	A1	(11) International Publication Number:	WO 94/09457
		(43) International Publication Date:	28 April 1994 (28.04.94)

(21) International Application Number: PCT/GB93/02114

(22) International Filing Date: 13 October 1993 (13.10.93)

(30) Priority data:
07/960.512   13 October 1992 (13.10.92)   US

(71) Applicant: GILBARCO LTD. [GB/GB]; Crompton Close, Basildon, Essex SS14 3BA (GB).

(72) Inventors: LEATHERMAN, Russel. D. ; 6106 Four Oaks Court, Summerfield, NC 27358 (US). BAKER. Walter. L. ; 404 Arrowhead Drive, Greensboro, NC 27410 (US).

(74) Agent: COCKAYNE, Gillian; GEC Patent Department, Waterhouse Lane, Chelmsford, Essex CM1 2QX (GB).

(81) Designated States: AU. CA. NO. NZ. European patent (AT. BE. CH. DE. DK. ES. FR. GB. GR. IE. IT. LU. MC. NL, PT. SE).

Published
With international search report.
Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

(54) Title: TRANSACTION APPARATUS
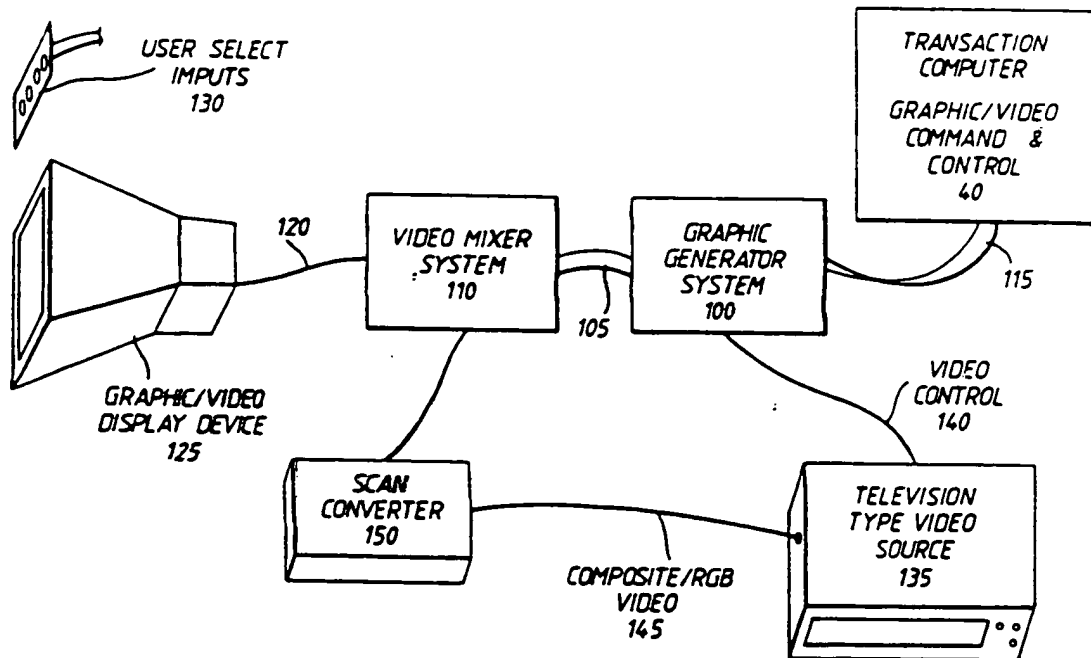
(57) Abstract

Transaction apparatus, particularly a fuel dispenser, comprises a video signal source (135), a graphics circuit (100) and a raster-scanned display (125) such that graphics data relating to a transaction can be superimposed on a background video display.

1

TRANSACTION APPARATUS

The present invention relates to a transaction apparatus comprising a raster-scannable display for displaying information relating to a transaction, and more particularly, but not exclusively, to such apparatus comprising a fuel dispenser.

Fuel dispensers have evolved from having mechanical dial readouts to LED displays to more recent liquid crystal displays. Further developments, such as those incorporated in **THE ADVANTAGE**™ line of fuel dispensers marketed by Gilbarco Inc., include card readers to enable credit cards to be read by the dispenser, with communications back to the credit card issuer to ascertain if the credit card is valid. However, some customers have difficulty using the technology because of lack of familiarity with the procedures required. Accordingly, it would be helpful to users of that sort to have as much customized assistance to direct them in the use of the self-service dispenser. Also, the option of being able to advertise additional products or services for sale would be desirable to the service station operator.

According to the present invention there is provided transaction apparatus comprising: a video signal source; a graphics circuit for generating a graphics signal; a raster-scanned display,and circuit means for selectively directing graphics signals concerning transactions or video signals or a combination of them to the raster-scanned display.

The present invention permits a customer performing a transaction to be prompted by graphics on the display through various steps of the transaction process. In addition it enables advertising material or other information to be provided by means of video on the display. It is particularly advantageous therefore for the circuit means

to monitor the transaction and control the information on the display in dependence upon the stage of the transaction.

This invention can be applied to a CRT (cathode ray tube) device, a LCD (liquid crystal display) device, a gas plasma device, or any other device that is capable of displaying television type video. These are referred to generally herein as raster-scannable displays. An LCD colour display is preferred. Television type video can include conventional CGA, EGA, and VGA video type sources. In such display media, there are three methods which are commonly used to transport video and graphics systems from a generating source to the display media, these being: RGB video, S-video, and Composite video. All three of these methods perform the same functions with the difference being the ease of signal handling for Composite video, high display resolution for RGB, and both ease and high resolution for S-video. The present invention is independent of these three transmission methods with the acknowledgement that conventional circuits can be used to alter one of the transmission methods to any of the other two.

All three of the described video signal methods utilize the same basic timing constituents to format display information for the display device.

Conventional methods of attempting to incorporate video and graphics information involve the conversion of the television video into digital data which is then mathematically added to a digital graphical display format. This method is very expensive because of the processing that has to be accomplished in the space time relationship of the video signal. Also, digitizing television type video is cumbersome and the amount of memory required to store the digital images is expensive. For example, to represent a digital image of quality comparable to the original analogue

image would require a minimum of 13 million bits of computer storage. And, all 13 million bits need to be manipulated every 16 milliseconds. This represents very high costs for fast memories and hybrid digital converters. It is therefore preferable that analogue video signals are directed to the display overcoming these problems, and advantageously this is ahieved by the circuit means using the synchronization signals to establish graphics information signals synchronized with the video signals.

The present invention has advantages over the prior displays which displayed only single line instructions or information to a customer. Instead, instructions are given in a video format, with which there is widespread familiarity, rather than a display using technologies such as LED's. Customer ease-of-use is enhanced, not to mention the very much increased versatility of the types of displays capable on a raster-scannable display. Even for simple word messages, fonts can be customized, logos can be included, and the like.

In one embodiment the transaction apparatus further comprises a card reader for cards having magnetic stripes or other card forms such as smart cards, and the circuit means has a first communication link to an external card-verifying authority.

The invention is particularly advantageous where the transaction apparatus comprises a fuel dispenser, enabling advertising material to be communicated whilst the customer is performing the fuelling operation. Such advertising material may be of a general nature or may relate to a product or service available at the service station. It is particularly advantageous if means is provided for a customer of the transaction apparatus to authorize an additional transaction, the nature of the transaction being dependent upon the stage of the main transaction and the information on the display. This enables the additional transaction (such as purchase

of carwash token) to be made on impulse and added to the main transaction.

In a preferred embodiment a plurality of the fuel dispensers are provided and the video signal source supplies the same video signal to all of the plurality of fuel dispensers. Alternatively, the video player can provide individual video signals to each fuel dispenser.

Preferably the circuit means also comprises a beginning-of-program detector for the video signals, thereby directing video signals to the raster-scannable display only at detected program beginnings, wherein the circuit means is capable of selectively directing graphics information or video signals or a combination of them to the raster-scannable display. The beginning-of-program detector may detect a black level in a visual signal portion of the video signals, or a cue in the audio portion or in a synchronization signal. Also in a preferred embodiment, the circuit means determines the placement of graphics information concerning transactions on the raster-scannable display with video information.

One embodiment of the invention will now be described by way of example only with reference to the accompanying drawinsg of which:

Figure 1 is a block diagram of a service station illustrating major components of a preferred embodiment according to the present invention as linked together;

Figure 2 is an elevational view of a fuel dispenser of Figure 1, partially broken away;

Figure 3 is a block diagram of various components of the electronics used in a dispenser according to a preferred embodiment;

Figure 4 is a functional diagram of various components of the electronics of the video/graphic mixer; and

Figure 5 is a block diagram of one of the components depicted in Figure 4; and

Figure 6 is a block diagram of another of the components depicted in Figure 4;

Figure 7 and 8 are block diagrams of two alternate embodiments of one of the components depicted in Figure 6; and

Figure 9 is a schematic rendering of the relative positions of images to be displayed on a raster-scannable display of two signals to be displayed.

As seen in Figure 1, a service station 10 has on site a plurality of fuel dispensers 12 connected through a single distribution box 14 to a site controller 16. The site controller 16 is preferably the G-Site system controller sold by Gilbarco, Inc. of Greensboro, North Carolina. The controller 16 serves as an overall system controller for the multiplicity of fuel dispensers 12. It has a link to a remote credit- or debit- card-validating computer 18, such as a telephone link. The computer 18 may be hundreds or thousands of miles away from the service station, at the site of a card-issuing authority or the like.

The relationships of the dispensers 12, distribution box 14, controller 16, and computer 18 are conventional as regards the card-validating function. The controller 16 serves as a point-of-sale device somewhat like a cash register manned by an attendant, typically located in a kiosk or other store facility.

Each of the dispensers 12 is supplied with a video signal from a video source 135 through a distribution amplifier 20. It should be appreciated that each of the dispensers 12 is supplied with exactly the same signal, decreasing the investment required in video sources 135. Alternatively, of course, multiple video sources could be provided if desired. However, an important advantage of the invention is that it makes possible the use of only a single source. The source may be any conventional

source of video signals such as a video tape recorder, a video disk, a live camera, an over-the-air or over-cable reception, or the like.

Turning now to Figure 2 which shows an elevational view of one of the dispensers 12, the dispenser includes a conventional nozzle 36 connected through a hose 34 to the dispenser housing, for dispensing gasoline or other fuel in a conventional fashion. The fuel is supplied from an underground reservoir through a conduit 28 to the hose 34. A metering device 30 from the conduit 28 ascertains the volume of fuel delivered through the conduit 28 and communicates that data over a line 32 to transaction computer 40 in the dispenser 12. The volume is used to compute and display the transaction data on conventional transaction indicia 38.

The dispenser also includes a magnetic stripe card reader 22, a cash acceptor 24, and a receipt printer 26, all of any desired design. The transactions in which the components 22, 24, 26 are involved are computed and ascertained by the metering device 30 which also calculates and displays the transaction indicia 38. The metering device 30 outputs signals to a transaction computer 40 as is conventional in products such as the Gilbarco line of CRIND (Card Reader IN Dispenser) dispensers sold under the trademark THE ADVANTAGE™. The transaction computer 40 outputs graphic/video command and control data over line 115, as shown in Figure 3, and is programmed with desired placement of a selection of messages on a video screen.

Referring back to Figure 2, a video screen 125 can be seen displaying information concerning a carwash transaction which can be elected by a customer in combination with a fuelling transaction. Associated with the video display 125 is a keypad 130 similar to those conventionally used with bank automated teller machine displays. That is, a plurality of keys 130 are aligned with the raster-scannable display

125 so that the effect of pressing one or more of the keys 130 is explained to a user by the display on the screen 125. Other keypads 130 on other sides of the display 125 may be provided, or the one keypad may be located on another side. Additional keypads 42, 44 are provided for further transaction entry data to the control computer 40, in convention fashion. If desired, the apparatus could be configured for data input through a touch screen.

Figure 3 illustrates the basic components of a preferred embodiment of the invention. Much of this system can be reconfigured, and it is the purpose of the figure to illustrate but one example of the individual component functions. The television video source 135 is representative of one of any number of television compatible sources (i.e., VCR's, video disks live cameras, cable and radio transmission, etc.). The source is not important as long as video signal timing is used. A particularly significant advantage of the present invention is that the video signal can be handled totally in analogue form, avoiding the expense of digitization. Component 150 is a scan rate converter which converts standard RS170 video levels and timing to the higher speed of high resolution data display systems such as EGA and VGA computer video interfaces. Component 150 is an optional component and is not needed when the computer graphics video timing can be made to operate at the standard RS170 levels and timing for television video.

Component 100 is representative of any number of graphic generation sources which output video in RGB, Composite or S-Video. Component 110 implements the synchronization between the graphics source 100 and the video source 135. Component 125 is any display media that is capable of displaying a raster scan image format. Two examples are liquid crystal displays and cathode ray tubes. Control input

130 may or may not be provided to the user to provide for input to the control system 40 which drives the display system through cable 115. Component 130 could be a button interface or a conventional touch screen interface which would allow the user to select information on the screen in response to the control functions of the computer driving the graphic/video system.

Transaction computer 40 connected at 115 sends graphic control information to the graphic generator system 110. This information can be any information that is normally expressed to the operator or user of a piece of equipment that would normally be represented on a graphic, single line or multi-line display. In a Gilbarco CRIND product, this control display information is processed by the generic function of block 100 and sent to a single line media display. In the invention, this formatted graphic information is routed to the video mixing system which provides several functions that allow the normal single media graphic display information to be formatted with video information from a variety of television type video sources in order to be displayed together.

The invention utilizes the horizontal and vertical timing of the external television video to construct a compatible timing framework for the graphic video signals to be combined with the video. This is based on the premise that one of the sources, either the graphic or the video, must be controllable in regard to the generation of the synchronization information. Since the television type video has fixed synchronization information, the computer graphic generator is synchronized with the video signal.

The video mixing system 110 provides information through cable 105 back to the graphic generator 100 which allows synchronization to be established. In order to do this, the video mixing system 110 extracts the horizontal and vertical timing

9

indicators from the external television type video cable 145 and creates from these indicators a master clock frequency which the graphic generator 100 uses to create graphic information for the media display 125. Since this enables the base timing of the graphic generator to be derived from the external television type video by the video mixing device, the timing between the graphics and the external video will be synchronized and mixing can occur within the established timing framework.

Figure 4 illustrates the basic function blocks found in a preferred embodiment. There are eight functions shown for the synchronization and mixing function, although some of them may not be needed, depending on what kind of video (RGB, Composite, or S-Video) is being mixed.

Block 205 is a tuner block which extracts the video signal if it has been modulated onto a radio frequency carrier. Modulation is usually done to preserve the quality and aid in the transmission of cable TV type signals. If the external video is not modulated onto a carrier, then block 205 is not needed.

Block 215 is a conventional device that has several common implementations. Its function is to separate the synchronization signals if the video signals of line 210 are composite or S-video signals. It outputs the vertical synchronization signals on line 220 and the horizontal on line 225. If RGB video is input on line 210, then synchronization information is sent with the signal by convention and the sync separation process is not needed. For composite and S-video signals, the sync separator extracts the horizontal and vertical synchronization indicators for use in the mixing process.

Block 230 is a conventional video standard converter designed to operate in whatever of the three modes best suits the external and graphics video for mixing.

If the external video was composite and the computer graphics video of block 100 was in RGB, then the converter block 230 would be a conventional circuit to decode the external television type signal into RGB for mixing. Block 230 may also be designed to convert any one of the other three aforementioned video formats into any of the others (i.e., RGB into Composite, Composite to S-Video, S-Video to RGB, etc.). If the external video and the graphics video are of a compatible type suitable for mixing, then block 230 is not needed.

Block 270 uses the synchronization information from block 215 to create a compatible timing framework for the mixing process. Block 270 uses a conventional principle called phase locking in order to establish the unique timing relationship needed to conduct the video/graphics mixing process. The structure and process of block 270 may be analogous to that described in U.S. Patents 4,631,588 to Barnes et al. or 4,498,098 to Stell. The disclosures of those patents are hereby incorporated by reference. The output of block 270 provides a stable master dot (or pixel) clock signal 280 which the graphic generator 100 uses to create the graphic images to be mixed with the external video. The graphic generator 100 uses the dot clock signal on line 280 to generate a horizontal synchronization indicator 275 which is sent back to block 270 to be used in the phase lock process. It is this re-derivation of the horizontal synchronization 275 from the dot clock signal 280 which aligns the external and graphic video so that the mixing process is possible.

Block 290 further aligns the synchronization process defined by block 270 by coordinating the vertical synchronization of the external television type video and the graphics video. This process is simple once the horizontal synchronization has been established. The vertical synchronization process uses the derived dot clock signal

280 to measure the number of clock cycles difference which may exist between the external video synchronization signal 220 and a vertical synchronization indicator 300 generated by the graphic generator. Note that the vertical synchronization indicator 300 for the graphic generator 100 is derived from the dot clock signal 280 in much the same way as the graphic horizontal signal 275. When a defined number of dot clock cycles of time difference exists between the external video vertical synchronization indicator 220 and the graphic generator vertical synchronization indicator 300, block 290 sends a synchronization signal over line 295 to the graphic generator 100 to tell it to realign the generation of the vertical synchronization indicator 300.

Block 255 determines which areas of the display media receive which signals by a timing function that interfaces with the derived dot clock 280 and the horizontal indicator 225. The derived dot clock 280 and the horizontal indicator 225 are logically combined to create a space time signal that is representative of an area of the display media.

Figure 6 shows the main functions of the windowing circuit 255. Signals 235 and 310 are provided to blocks 404 and 406 which strip timing information from the video signals. Alternatively, the stripped signals from separator 215 and the computer signal 310 may be used. Block 416 provides the windowing function of signals 400 and 402 utilizing the horizontal sync signal and the vertical sync signal 410.

Block 416 can provide the windowing function in one of two ways, both of which create a space-timing relationship with the video signals. The first method utilizes the master clock signal 280 used to operate the graphic generator source. In the embodiment of Figure 7, timing block 416 utilizes the graphic clock signals to count down the horizontal time duration 436 of the developed window as shown in Figure

9. The clock signal 280 is routed into conventional counters 426 which control either the horizontal time ~~ ‘‘ ‘ .ne horizontal time off 424. The vertical area 433 of the window 438 is accomplished by routing the horizontal sync pulses into counter 428 which controls with the vertical time on 430 or the vertical time off 432. Signals 422, 424, 430, 432 are logically combined in block 434 to provide a signal 265 which indicates when the video window is active based on the loaded counts into counter blocks 426 and 428 from logic control bus 260 provided by computer 40. Control line 250 is provided for the circuit to be disabled by block 248 when video is not present. Vertical sync 210 is used to reset the counters 426 and 428 after each video frame in order to establish a new window 438.

The second method utilizes analogue timing components to effect the timing to develop the window. In the embodiment of Figure 8, timing block 416 utilizes a conventional "one shot" type circuit to develop the horizontal time duration 436 of the window as shown in Figure 9. The horizontal sync pulses are routed to active the one shot block 427, which develops the time duration for the horizontal time on 422 or the horizontal time off 432. Signals 422, 424, 430, 432 are logically combined in block 434 to provide a signal 265 which indicates when the video window is active based on the time constants of one shot blocks 427 and 429 from logic control bus 260. Control line 250 is provided for the circuit to be disabled by block 248 when video is not present.

A window enable signal 265 produced by block 255 indicates that external video 235 is being mixed with the graphic video 310. Signal 265 operates on block 305 which contains conventional analogue signal multiplexers which provide the straight overlay process or mixing process. This is to say that signal 265 logically

places either the graphics 310 or the external video on separate portions of the display media screen, or allow an analogue mixing of the graphic 310 and external video 235 in a portion of the screen.

Block 240 is responsible for the continuous sequencing of external video material. Block 240 is intended to function with external video that has been created to repeat in a continuous loop and allows the user of the system to view the start of a video segment placed on the VCR tape or laser disc source.

Block 240 is especially useful in a video environment where multiple devices are trying to use a single video source. It provides a means independent of the media for detecting the breaks between the source program material.

Block 240 explicitly addresses external video that has been created to repeat in a continuous loop or simply runs continuously and does not repeat, like television programming. Block 240 allows the user of a system which utilizes external video information to view the start of a video segment from an external source which could be a VCR tape, laser disc source, or normal television programming. The program detector 240 allows the user to queue and use a desired video segment on a continuous format in its entirety without starting in the middle of the segment.

Figure 5 illustrates in block form the operation of the program detector 240. Four conventional components combine to comprise the program detect function: a video signal integrator 232, an integration timer 236, a threshold detector 248 and a logical discriminator 258.

Block 232 performs a common voltage or current integration function. It integrates (or adds up over time) the actions of the video signal 210 to provide an output signal 254 which is indicative of the accumulated video signal over time. The

function of integration is conventional and can be implemented with a number of common technologies.

Block 236 is an integration timer which controls the period over which the video signal 210 is accumulated. This timing function is commonly known in the art as an integration period and is fundamental mathematically for performing the integration process in block 232. The timing function of block 236 can be implemented with the timing of the video signals 220 and/or 225 with counters, or with an external clock with counters, or with an analogue timing function. When the period of integration is determined by clock 236, then a signal 244 is sent to the video signal integrator 232 to reset the accumulated level so that a new level can be accumulated.

Block 248 is a conventional threshold comparator. Signal 252 applied to block 248 is a voltage threshold level which is indicative of the minimum amount of video signal level 210 that would be apparent over the video integration timer period 236 and is comparable to a black video level. A black video level is indicative of a video signal with no video program present. This signal 252 is at a level equal to the accumulation of this known black level over time and is compared with the accumulation level 254. The comparator 248 can thus indicate that the incoming video signal 210 has no active video present.

The result of the comparison of the accumulated video level 254 to the known accumulation of a black level 252 over the time dictated by timer 236 is sent to the logical discriminator 258. Block 258 in Figure 2 is implemented with a conventional AND function, but could be constructed with any logical construct that performs the function in coordination with block 255. The logical function simply combines the indication of the end of the integration period 246 with the comparison result 248 to

provide a logical output 262 to device 255 to indicate that a program end/beginning

has occurred. This indication can then be used by the window boundary circuit 255

to enable the passage of the video signal through block 305 if the computer has

signalled for video program on line 260.

Referring again to Figure 3, the operation of the system begins when the

command/control computer 40 attached to the graphic generator 100 through cable

115 instructs the graphic generator 100 to format and display graphic data to the user

on display media 125. The graphic generator 100 has control of the video mixer 110

through cable 105 and can instruct the video mixer 110 with signals 260 to allow the

graphic data 310 to be displayed to the user without external video mixing.

Alternatively, it can instruct that video signals be displayed or a combination of the two

in respective video screen portions. As a result of the graphic data 310 being placed

on the display media 125 the user may or may not input requests to the control

system through input 130. For example, in the display of Figure 2, the user may

select a carwash option through the use of one or more of the inputs 130. In either

case, the command/control computer can request through cable 115 that the graphic

generator 100 display graphics 310 and external video 235 simultaneously on display

media 125. The control commands sent through cable 115 set up the size of the

window with signals 260 into block 255. If the program detector 240 is implemented,

then 240 will search the incoming video 210 for a gap between messages before

allowing the mixing window to appear on the display media 125.

The invention is specifically designed to be used in conjunction with the

inventions described in copending applications entitled "An Apparatus and Method for

Displaying Video Information" of Hans Atchley and "Apparatus and Method for

Encoding/Recovering Multi-media Control Signals in an Audio/Video Program" of Joseph Daniel Long, both filed on even date herewith. The disclosures of those two applications are hereby incorporated herein by reference.

Those of ordinary skill in the art will recognize that the invention as disclosed herein may be implemented in numerous embodiments which differ from the specific disclosure hereof. All such embodiments which fall within the scope of the appended claims are deemed to be within the scope of the patent.

CLAIMS

1. Transaction apparatus comprising: a video signal source; a graphics circuit for generating a graphics signal; a raster-scanned display, and circuit means for selectively directing graphics signals concerning transactions or video signals or a combination of them to the raster-scanned display.

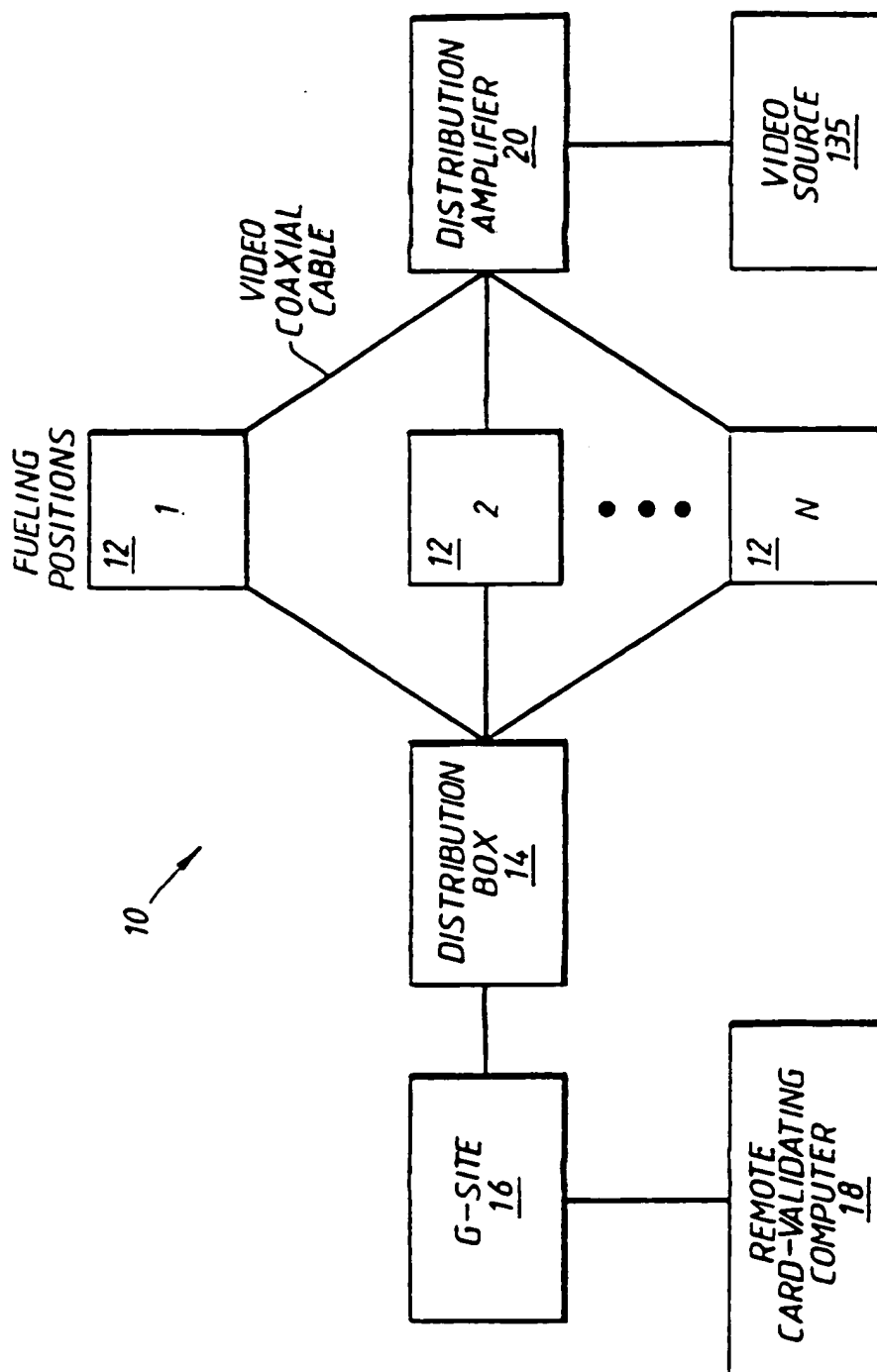2. Apparatus as claimed in claim 1 wherein the video signals are analogue signals as directed to the raster-scanned display.

3. Apparatus as claimed in claim 1 or 2 wherein the circuit means monitors the transaction and controls the information on the display in dependence upon the stage of the transaction.

4. Apparatus as claimed in claim 1, 2 or 3 further comprising a user-actuable portion to permit responses to be communicated to the circuit means.

5. Apparatus as claimed in claim 4 wherein the user-actuable portion enables a customer to authorize an additional transaction, the nature of the transaction being dependent upon the stage of the main transaction and the information on the display.

6. Apparatus as claimed in any preceding claim further comprising a card reader, wherein the circuit means has a first communication link to an external card-verifying authority.

7.   Apparatus as claimed in any prededing claim wherein the circuit means includes a beginning-of-program detector for the video signals and starts directing video signals to the raster-scanned display only at detected program beginnings.

8.   Apparatus as claimed in any preceding claim wherein the circuit means selectively directs graphics signals concerning transactions or video signals or a combination of them to the raster-scanned display, in dependence on the stage of the transaction.

9.   Apparatus as claimed in any preceding claim wherein the circuit means uses synchronization signals in the video signals to establish graphics signals synchronized with the video signals.

10.   Apparatus as claimed in any preceding claim wherein the circuit means determines the relative placement of graphics information concerning transactions on the raster-scanned display with video information.

11.   Apparatus as claimed in any preceding claim wherein the raster-scanned display is a liquid crystal display.

12.   Apparatus as claimed in any preceding claim wherein the circuit means converts one of the video or graphics signals to be compatible with the other one of the video or graphics signals.

13.   Apparatus as claimed in any preceding claim wherein the transaction apparatus comprises a fuel dispenser.

14.   Apparatus as claimed in claim 13 wherein the dispenser has a fuel meter communicating data about fuel dispensed to said circuit means.

15.   Apparatus as claimed in claim 13 or 14 comprising a plurality of fuel dispensers wherein the video signal source supplies the same video signal to all of the plurality of fuel dispensers.

16.   Apparatus substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

17.   A method of dispensing fuel at a retail site comprising

        providing a fuel dispenser having a raster-scannable display of information,

        generating graphics information concerning transactions for display on the raster-scannable display,

        supplying video signals to the fuel dispenser to be displayed on the raster-scannable display, and

        selectively directing graphics information concerning transactions or video signals or a combination of them to the raster-scannable display.

1/8

Fig. 1
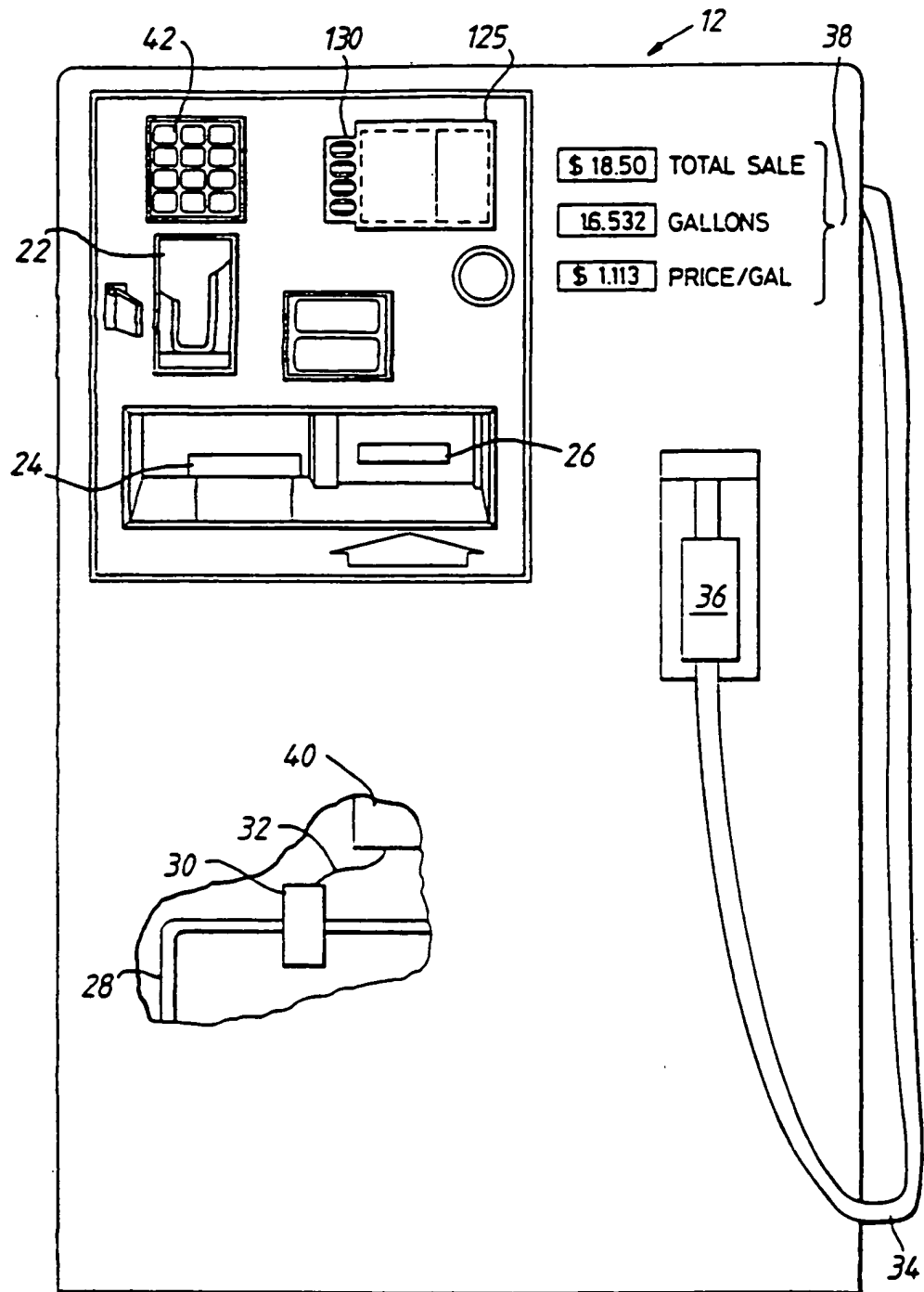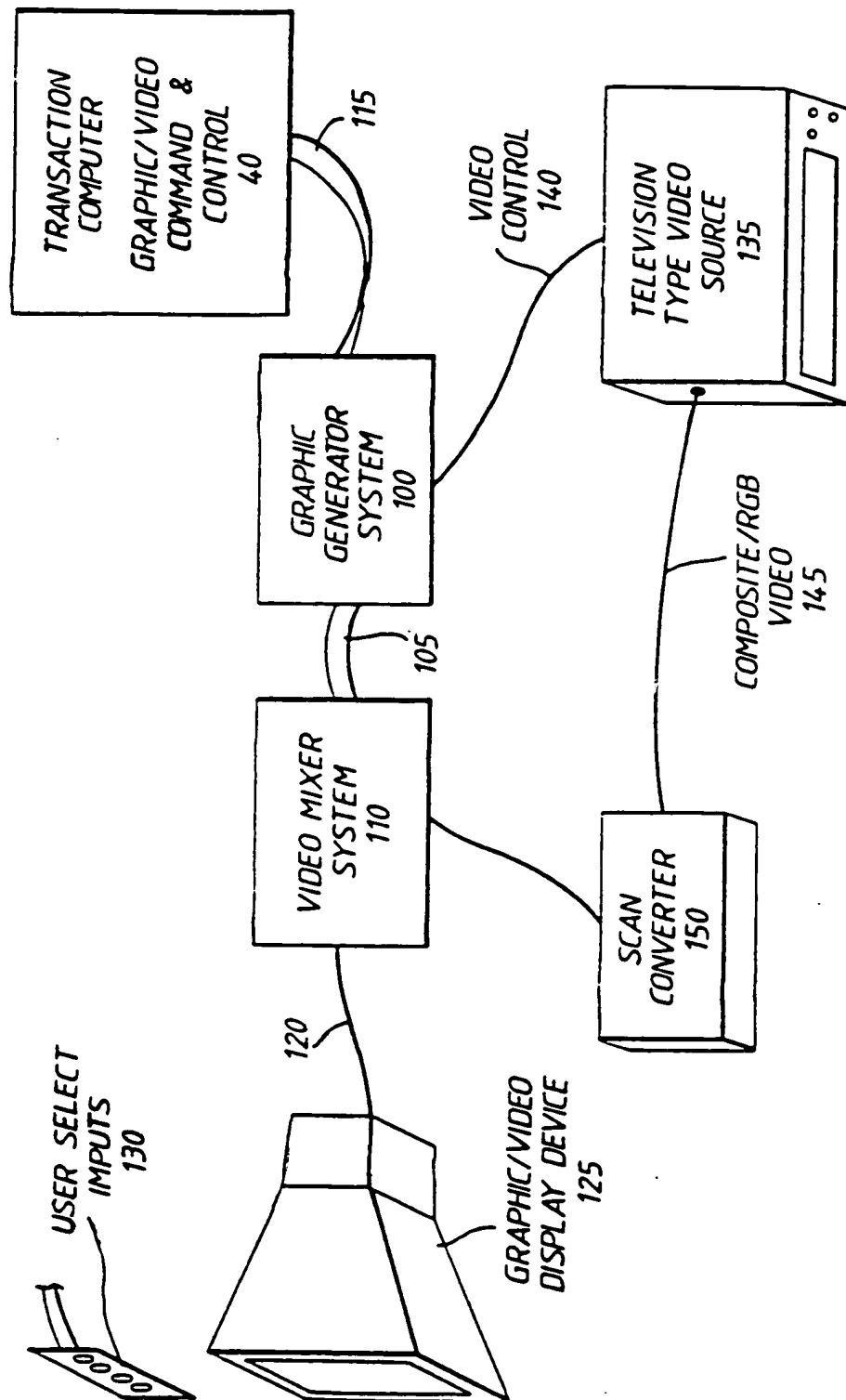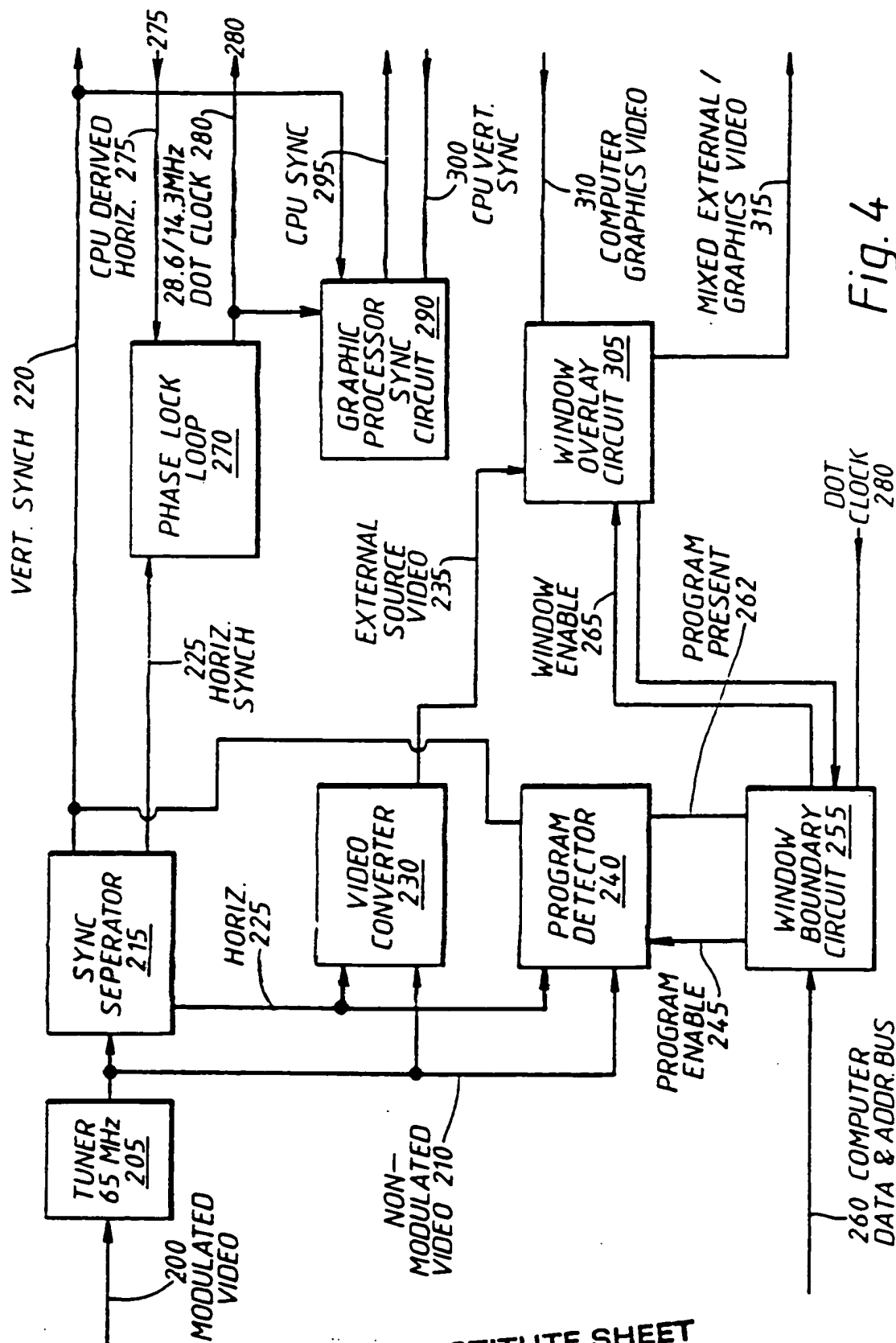
$ 18.50 TOTAL SALE
16.532 GALLONS
$ 1.113 PRICE/GAL

Fig. 2

3/8

Fig.3

4/8

Fig. 4
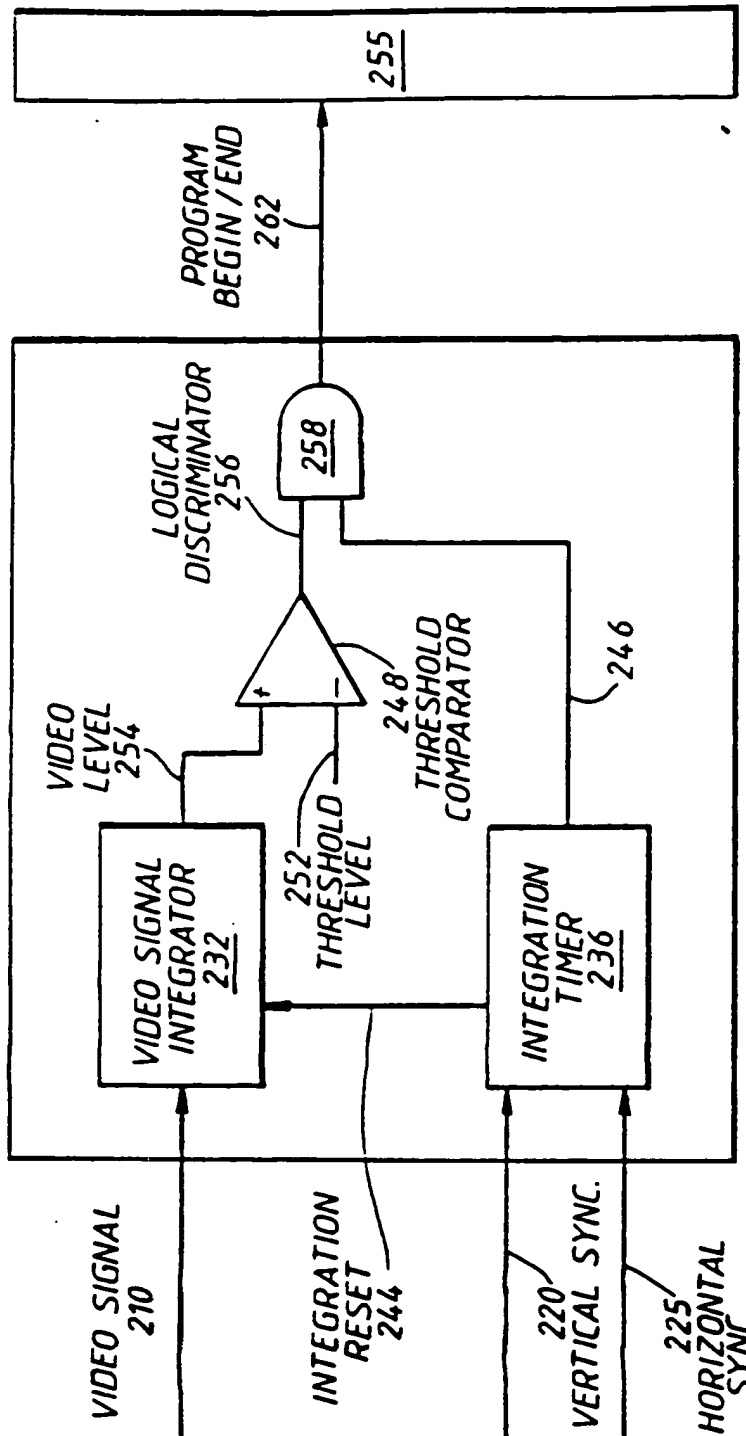
Fig. 5
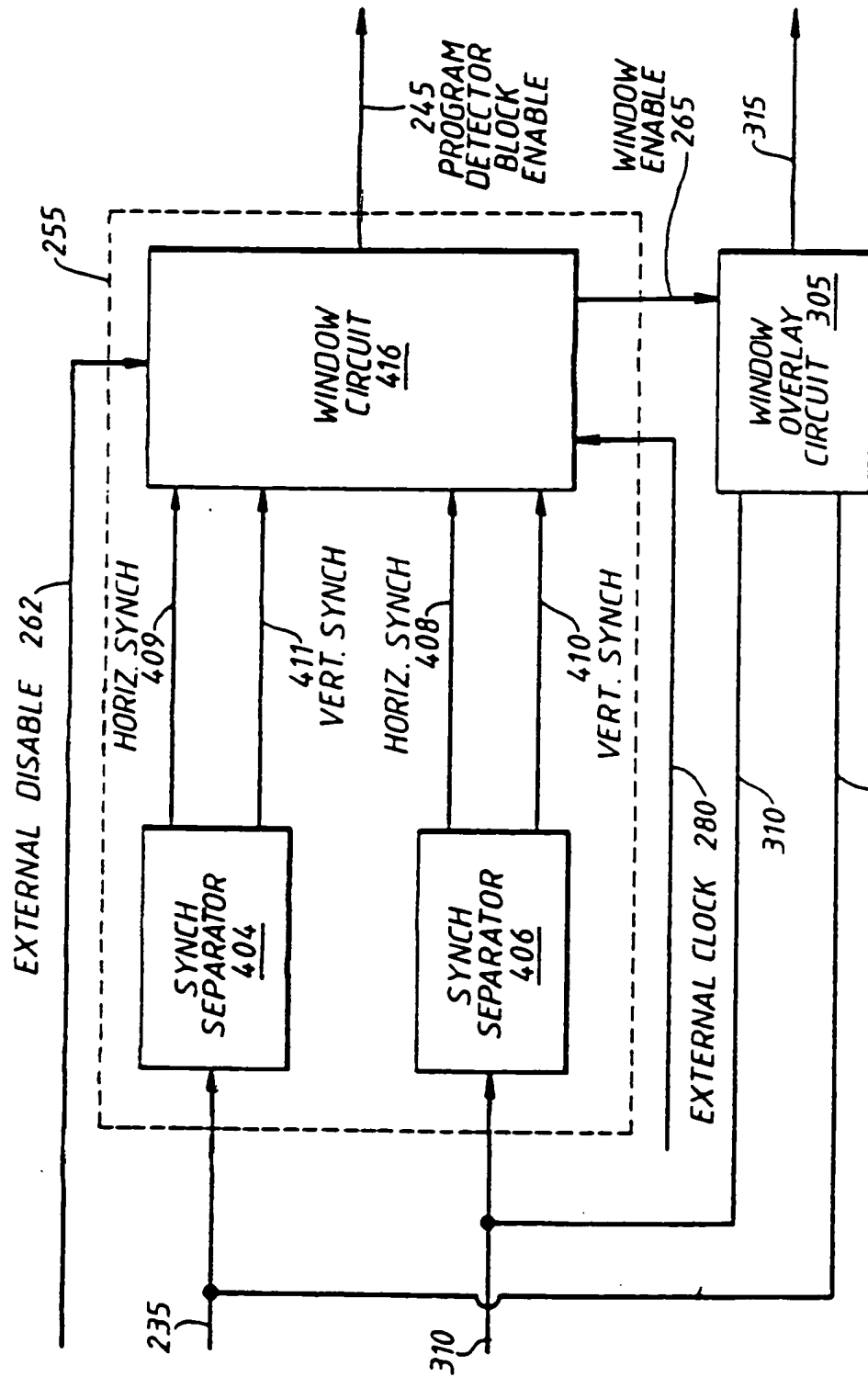
Fig.6
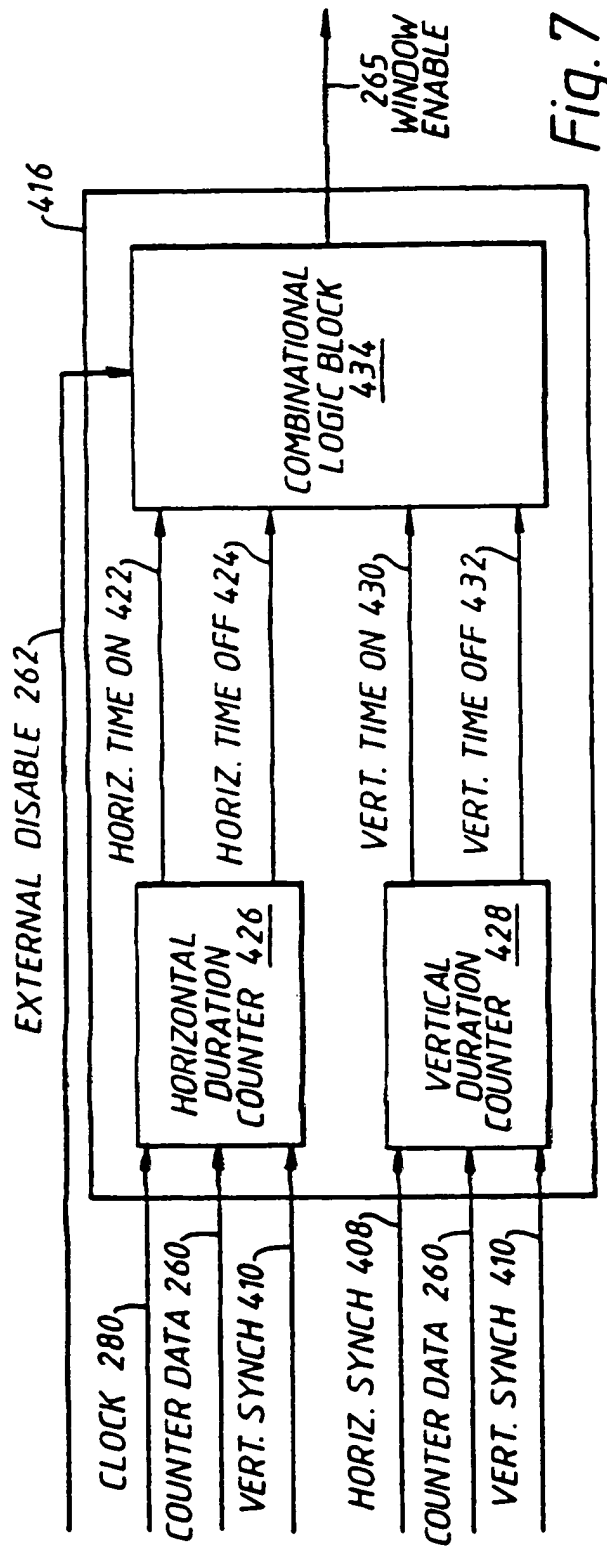
Fig. 7
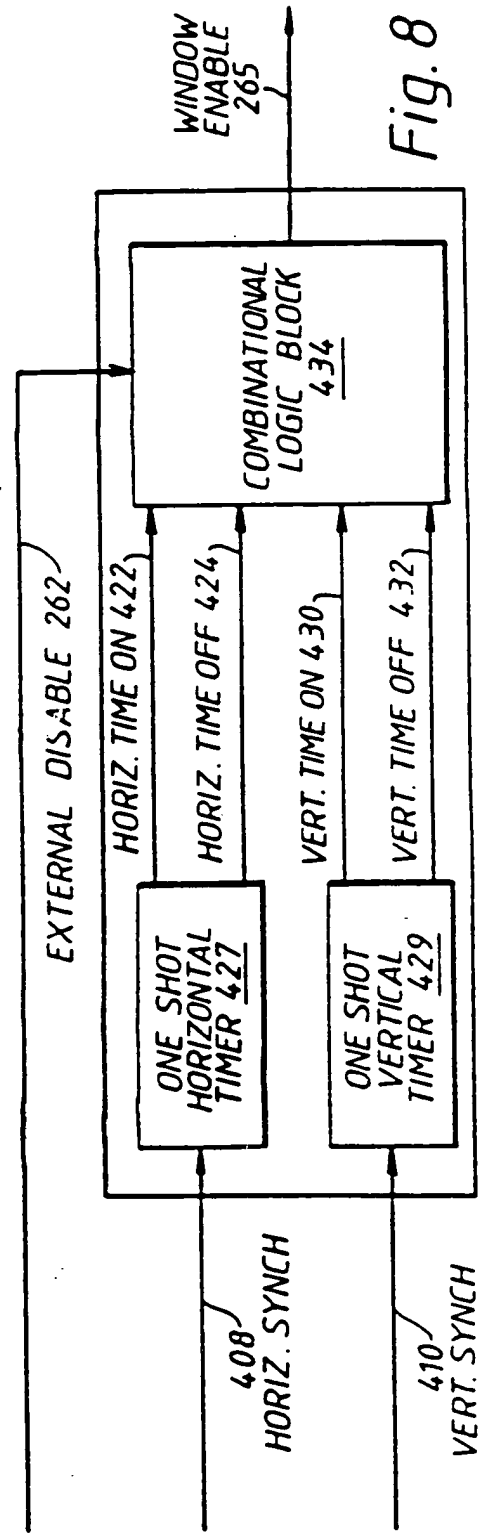
Fig. 8
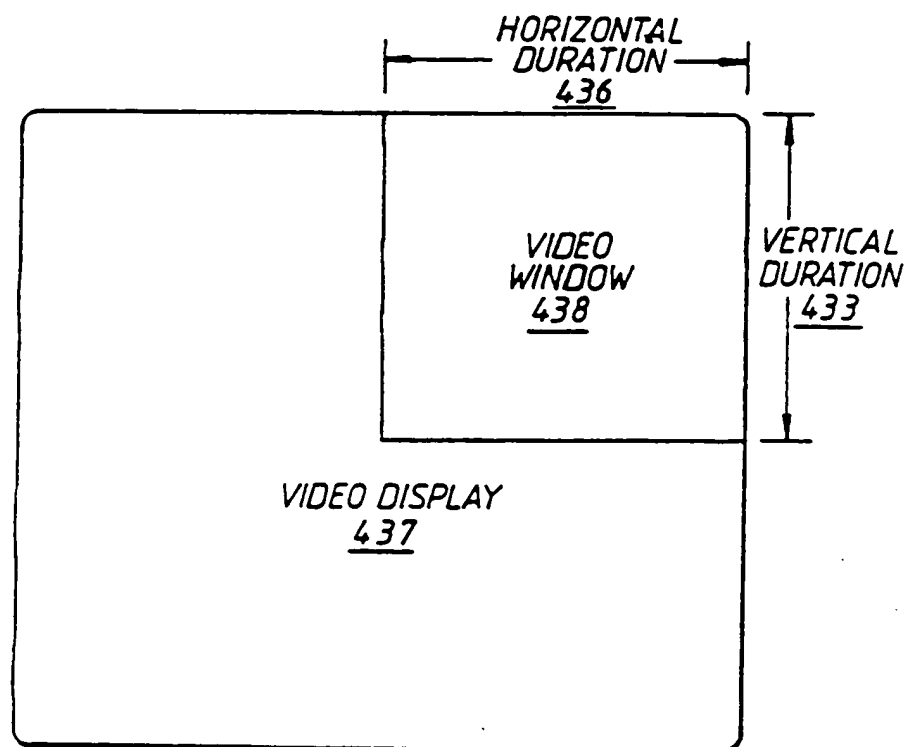
Fig. 9

INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
IPC 5 G07F13/02   G07F7/10   G09G5/14   G09G1/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 5 G07F G09G G06F 867D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO,A,89 00974 (P.HOLLIDGE) 9 February 1989 see page 3, line 9 - page 5, line 21 see page 21, line 22 - page 25, line 29 see page 30, line 16 - page 31, line 10; claims 1-3,6-13,17-21; figures 3,6,9-12 see figures 14-22 ---	1-17
Y	US,A,4 498 098 (DOUGLAS E. STELL) 5 February 1985 cited in the application see abstract; claims 1,2; figures 1,2	1-12
A	---	13-15,17
	-/--	

☒ Further documents are listed in the continuation of box C.   ☒ Patent family members are listed in annex.

Date of the actual completion of the international search	Date of mailing of the international search report
16 February 1994	2 5 -02- 1994

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Guivol, 0

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	GB,A,1 496 984 (DIEBOLD,INC.) 5 January 1978 see page 1, line 67 - page 2, line 85 see page 5, line 22 - line 85; claims 1-8; figures 3-11	1-12
A		13-15,17
A	US,A,4 630 754 (KOMUKAI) 23 December 1986 see figures 1,2,7-9	1-17
A	US,A,4 644 401 (GASKINS) 17 February 1987 see column 2, line 64 - column 6, line 4; claim 1; figures 1-8	1-5,7-12
A	EP,A,0 366 871 (MITSUBISHI DENKI K.K.) 9 May 1990 see the whole document	1-3,7-12
A	EP,A,0 284 764 (INTERNATIONAL BUSINESS MACHINES - I.B.M.) 5 October 1988 see ; claims 1-5; figures 1-5	1-12
A	WO,A,89 07807 (P.VOGEL) 24 August 1989 see page 4, line 14 - page 5, line 32; claims 1-7; figures 1,3,4	1-3
A	US,A,4 395 627 (BARKER ET.AL.) 26 July 1983	

1

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
WO-A-8900974	09-02-89	CA-A-	1301929	26-05-92
		AU-A-	2128188	01-03-89
		EP-A-	0370055	30-05-90
		JP-T-	3500760	21-02-91
		US-A-	5027282	25-06-91
US-A-4498098	05-02-85	AU-A-	1501683	08-12-83
		CA-A-	1185377	09-04-85
		EP-A,B	0096628	21-12-83
		JP-C-	1628356	20-12-91
		JP-B-	2052911	15-11-90
		JP-A-	59057279	02-04-84
GB-A-1496984	05-01-78	NONE		
US-A-4630754	23-12-86	JP-B-	5030715	10-05-93
		JP-A-	60251090	11-12-85
		JP-C-	1679599	13-07-92
		JP-B-	3046396	16-07-91
		JP-A-	60090196	21-05-85
US-A-4644401	17-02-87	NONE		
EP-A-0366871	09-05-90	JP-A-	2123881	11-05-90
		US-A-	4996598	26-02-91
EP-A-0284764	05-10-88	US-A-	4884199	28-11-89
		JP-C-	1712334	11-11-92
		JP-B-	3081183	27-12-91
		JP-A-	63216169	08-09-88
WO-A-8907807	24-08-89	AU-B-	628801	24-09-92
		AU-A-	3069589	06-09-89
		US-A-	5117407	26-05-92
US-A-4395627	26-07-83	CA-A-	1198822	31-12-85
		JP-A-	58123155	22-07-83